

US EPA Mid-Continent Ecology Division

Research Project Summary

Environmental Monitoring and Assessment of Great River Ecosystems

Overview

The goal of the EMAP-GRE initiative is to develop, apply, and propagate cost-effective and efficient methodologies to assess environmental conditions of the Upper Mississippi, Missouri, and Ohio Rivers. EPA will produce: 1) assessment methodologies destined to reside within States and agencies responsible for monitoring; 2) baseline data on the extent and condition of selected lotic, riparian, and floodplain resources which will facilitate analyses of trends; and 3) analyses of conditions as responses to natural and anthropogenic stressors. Data will be collected at multiple spatial scales from field plots to river reaches to landscapes. Products will assist EPA's Regional Offices and the States to report the condition of aquatic resources as mandated in the Clean Water Act. The quantification of changes in ecological condition and understanding of stressor/response associations support the use of adaptive management for Great Rivers. In 2004, pilot studies are scheduled to test sampling protocols and analytical procedures. The three-year assessment phase will commence in 2005.

A key strength of EPA's EMAP strategy is the use of probability-based surveys that permit the inference of environmental condition of an entire resource population from a relatively small sample size. The resource populations assessed in the EMAP-GRE initiative are based on the major geomorphic divisions of the rivers. While the scope of the program is limited to these systems, the methodologies developed should be suitable for other Great Rivers of the country. Within each geomorphic division, certain main-channel, backwater, and floodplain habitats will be sampled. Assessment products will be statements of the proportion or length of river in which a resource has a particular condition. As appropriate water quality or biological criteria become available, such statements can report the proportion of the river impaired for specific reasons. Another product will be statistically-sound estimates of the areal extent of habitats such as floodplain forests or wetlands. EMAP designs are capable of incorporating other spatial units, such as States or ecoregions, into the project if the opportunity to sample them arises. It is hoped that our ecosystem-level perspective (i.e., sampling multiple habitats over large scales) and the flexibility of the survey design will attract partners from States and management agencies and will improve the overall capacities for Great River assessments.

The program will focus on bioassessments primarily using the assemblages of fish, macroinvertebrates, algae, and vegetation. Measurements will be made for species richness, diversity, abundance, and community integrity. Physical and chemical measurements will serve as indicators of condition and potential stressors of the biota. Indicators with known application to priority assessment objectives will be analyzed across the entire system. Indicators with potential importance to assessment objectives will be tested at a subset of sites. The data requirements of individual indicators will be integrated into cost-effective and efficient collection protocols.

Probability-based monitoring programs will improve the capacity of States to assess the quality of our Great Rivers. They will contribute to objective analyses of the ecological impacts of management decisions or the progress of pollution reduction and habitat restoration programs. The States will benefit from the cost-effective methods to collect the information necessary to better manage Great Rivers.

Key Products

Publish core indicators for assessing conditions in Great River ecosystems.

Publish initial assessment of a section of Upper Missouri.

Provide technical assistance to partners.

Publish assessment of Great River ecosystems and stressors influencing their conditions.

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